User Manual

A. Introduction

This product is a battery-powered, true-rms, auto-ranging digital multimeter with a 19999 LCD display and a backlight.

B. Safety Information

To avoid possible electrical shock, fire, or personal injury, please read all safety information before you use the product.

(1) Do **NOT** exceed the “**maximum value**” indicated in the Specification.
(2) Examine the connection of the test leads and the insulation of the product before measuring voltage higher than 36V DC or 25V AC.
(3) Disconnect the test leads from the circuit before changing the mode。
(4) Misuse of mode or range can lead to hazards, be cautious. “OL” will be shown on the display when the input is out of range.
(5) Safety symbols:

	Hazardous Voltage		Earth
	Double Insulated		Low Battery
	Risk of Danger. Check the User Manual.		

C. Specifications

Electrical Specifications				
Function	Range	Resolution	Accuracy	MAX. Value
DC Voltage (V)	1.9999V	0.0001V	±(0.05%+3)	1000V
	19.999V	0.001V		
	199.99V	0.01V		
	1000.0V	0.1V		
DC Voltage (mV)	19.999mV	0.001mV		199.99mV
	199.99mV	0.01mV		
AC Voltage (V)	1.9999V	0.0001V	±(0.3%+3)	750V
	19.999V	0.001V		
	199.99V	0.01V		
	750.0V	0.1V		
AC Voltage (mV)	19.999mV	0.001mV		199.99mV
	199.99mV	0.01mV		
DC Current (A)	1.9999A	0.0001A	±(0.5%+3)	19.999A
	19.999A	0.001A		
DC Current (mA)	19.999mA	0.001mA		199.99mA
	199.99mA	0.01mA		
DC Current (μA)	99.99μA	0.01μA		1999.9μA
	1999.9μA	0.1μA		
AC Current (A)	1.9999A	0.0001A	±(0.8%+3)	19.999A
	19.999A	0.001A		
AC Current (mA)	19.999mA	0.001mA		199.99mA
	199.99mA	0.01mA		
AC Current (μA)	99.99μA	0.01μA		1999.9μA
	1999.9μA	0.1μA		

Function	Range	Resolution	Accuracy	MAX. Value
Resistance	199.99Ω	0.01Ω	±(0.5%+3)	199.99MΩ
	1.9999kΩ	0.0001kΩ	±(0.2%+3)	
	19.999kΩ	0.001kΩ		
	199.99kΩ	0.01kΩ		
	1.9999MΩ	0.0001MΩ	±(1.0%+3)	
	19.999MΩ	0.001MΩ		
	199.99MΩ	0.01MΩ	±(5.0%+5)	
Capacitance	9.999nF	0.001nF	±(5.0%+20)	9.999mF
	99.99nF	0.01nF	±(2.0%+5)	
	999.9nF	0.1nF		
	9.999μF	0.001μF		
	99.99μF	0.01μF		
	999.9μF	0.1μF		
	9.999mF	0.001mF	±(5.0%+5)	
Frequency	99.99Hz	0.01Hz	±(0.1%+2)	9.999MHz
	999.9Hz	0.1Hz		
	9.999kHz	0.001kHz		
	99.99kHz	0.01kHz		
	999.9kHz	0.1kHz		
	9.999MHz	0.001MHz		
Duty Cycle	1%~99%	0.1%	±(0.1%+2)	
Diode	√			
Continuity	√			
NCV	√			
Temperature	(-20~1000)℃	1℃	±(2.5%+5）	1000℃
	(-4~1832)°F	1°F		1832°F

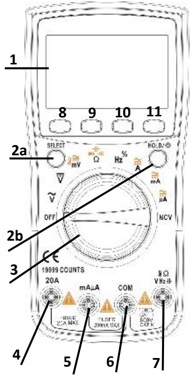
General Specifications	
Display（LCD）	19999 Counts
Ranging	Auto/Manual
Material	ABS
Update Rate	3 Times/Second
Ture RMS	√
Back Light	√
Data Hold	√
Relative Measurement	√
MAX/MIN	√
Low Battery Alert	√
Auto Power Off	√

Mechanical Specifications		
Dimension	180*90*45mm	
Weight	320g	
Battery Type	1.5V AA Batteries * 2	
Warranty	One year	
Environmental Specifications		
Operating	Temperature	0~40℃
	Humidity	＜75%
Storage	Temperature	-20~60℃
	Humidity	＜80%

D. Instruction

(1) Front Panel（see the picture on the right）

1. LCD display
2. buttons
   - 2a.SELECT: To toggle between different testing modes (functions), press this button.
   - 2b.HOLD/Backlight: To hold the current reading, press this button and you will see “HOLD” on the display; press again to cancel. To turn on the backlight, press this button for more than 2 seconds; long-press again to turn off.
3. Rotary Switch: To change mode or range。 (from OFF, clockwise)
   - 3a. OFF
   - 3b. AC Voltage (V)
   - 3c. DC Voltage (V)
   - 3d. AC Voltage(mV)/ DC Voltage(mV)/ Temperature
   - 3e. Resistance/Continuity/Diode/Capacitance
   - 3f. Frequency/Duty Cycle
   - 3g. AC/DC Current (A)
   - 3h. AC/DC Current (mA)
   - 3i. AC/DC Current (μA)
   - 3j. NCV
4. 20A: Input terminal for current (V) measurements.
5. mA/μA: Input terminal for current (mA and μA) measurements.
6. COM: Common terminal for all measurements.
7. VHz: Input terminal for voltage, frequency, duty cycle, resistance, continuity, diode, capacitance, and temperature measurements.
8. RANGE: press this button to enter the manual range; each push increases the range; when the highest range is reached, next push will go back to the lowest range; to exit the manual range mode, press the button for 2 seconds.
9. REL: the product allows relative measurements for the Modes of Voltage, Current, and Capacitance; press this button to enter the relative measurements mode; press again to exit.
10. MAX/MIN: press the button once to measure the MAX Value; press twice to measure the MIN Value; to exit the mode, press the button for 2 seconds.
11. Hz%: press this button when you measure AC Voltage or AC Current to measure their frequency/duty cycle.



(2) Measure AC/DC Voltage

1. Connect the black test lead to the COM Terminal and connect the red test lead to the VHz Terminal;
2. Turn the rotary switch to the AC Voltage (V) Mode, the DC Voltage (V) Mode, or the Voltage (mV) Mode;
3. Press SELECT to toggle between AC/DC;
4. Touch the probes to the correct test points of the circuit to measure the voltage;
5. Read the measured voltage on the display.

*Caution:

a. Do not measure voltage that exceeds the MAX Value as indicated in the Specifications;
b. Do not touch high voltage circuit during measurements.

(3) Measure AC/DC Current

1. Connect the black test lead to the COM Terminal and connect the red test lead to the 20A Terminal or the mA/μA Terminal (choose based on the value of current) ;
2. Turn the rotary switch to the AC/DC Current (A) Mode, the AC/DC Current (mA) Mode, or the AC/DC Current (μA) Mode;
3. Press SELECT to toggle between AC/DC;
4. Break the circuit path to be measured. Then connect the test leads across the break and apply power;
5. Read the measured current on the display.

*Caution:

a. Do not measure current that exceeds the MAX Value as indicated in the Specifications;
b. Use the 20A Terminal and the Current-A Mode when you are measuring an unknown current. Then switch to the mA/μA Terminal and the smaller Current Mode if necessary.

Do not input voltage exceeds 36V DC or 25V AC when you are at the setting of measuring current.

(4) Measure Resistance

1. Connect the black test lead to the COM Terminal and connect the red test lead to the VHz Terminal;
2. Turn the rotary switch to the Resistance Mode, and the display will show “OL”;
3. Touch the probes to the desired test points of the circuit to measure the resistance;
4. Read the measured resistance on the display.

*Caution:

a. Disconnect circuit power and discharge all capacitors before you test resistance.
b. Do not input voltage at the Resistance Mode.

(5) Measure Continuity

1. Connect the black test lead to the COM Terminal and connect the red test lead to the VHz Terminal;
2. Turn the rotary switch to the Resistance Mode, press SELECT once to toggle to the Continuity Mode;
3. Touch the probes to the desired test points of the circuit;
4. The built-in beeper will beep when the resistance is lower than 50Ω, which indicates a short circuit.

*Caution:

a. Do not input voltage at the Continuity Mode.

(6) Measure Diode

1. Connect the black test lead to the COM Terminal and connect the red test lead to the VHz Terminal;
2. Turn the rotary switch to the Resistance Mode, press SELECT twice to toggle to the Diode Mode;
3. Connect the red probe to the anode side and the black probe to the cathode side of the diode being tested;
4. Read the forward bias voltage value on the display;
5. If the polarity of the test leads is reversed with diode polarity or the diode is broken, the display reading shows “OL”.

*Caution:

a. Do not input voltage at the Diode Mode.
b. Disconnect circuit power and discharge all capacitors before you test diode.

(7) Measure Capacitance

1. Connect the black test lead to the COM Terminal and connect the red test lead to the VHz Terminal;
2. Turn the rotary switch to the Resistance Mode, press SELECT three times to toggle to the Capacitance Mode;
3. Connect the red probe to the anode side and the black probe to the cathode side of the capacitor being tested;
4. Read the measured capacitance value on the display once the reading is stablized.

*Caution:

a. Disconnect circuit power and discharge all capacitors before you test capacitance.

(8) Measure Frequency and Duty Cycle

1. Connect the black test lead to the COM Terminal and connect the red test lead to the VHz Terminal;
2. Turn the rotary switch to the AC Voltage(V) Mode; press RANGE to toggle to the Frequency Mode (with high voltage), press RANGE again to measure duty cycle; or turn the rotary switch to the Frequency Mode (with low voltage), press to toggle to the Duty Cycle Mode;
3. Touch the probes to the desired test points of the circuit;
4. Read the measured frequency/duty cycle value on the display.

*Caution:

a. The Frequency Mode only applies to measure high frequency with low voltage.

(9) Measure Temperature

1. Connect the black thermocouple probe to the COM Terminal and connect the red thermocouple probe to the VHz Terminal;
2. Turn the rotary switch to the Temperature Mode, and the display will show the room temperature, to toggle between ℃/℉, press SELECT button;
3. Touch the probes to the desired test points;
4. Read the measured temperature on the display.

*Caution:

a. Do not input voltage at the Temperature Mode.

(10) Test NCV

1. Turn the rotary switch to the NCV Mode;
2. Hold the product and move it around, the built-in beeper will beep when the inner sensor detects AC voltage nearby. The stronger the voltage is, the quicker the beeper beeps.

(11) Auto Power Off

1. The product automatically powers off after 15 minutes of inactivity;
2. The built-in beeper beeps 5 times 1 minute before power off;
3. To restart the product, press SELECT button;
4. To disable the Auto Power Off function, hold down the SELECT button when turning on the product, you will hear five beeps if you have successfully disabled the function.

E. Genearl Maintenance

Beyond replacing batteries and fuses, do not attempt to repair or service the product unless you are qualified to do so and have the relevant calibration, performance test, and service instructions.

(1) Do not operate the product around hot, wet, flammable, explosive or magnetic environments.
(2) Clean the product with damp cloth and mild detergent; do not use abrasives or solvents.
(3) Remove the input signals before you clean the product.
(4) Remove the batteries if you will not use the product for a long time to prevent possible battery leak.
(5) When “ ” is shown on the display, batteries shall be replaced as below:
    1. Loosen the screw and remove the battery cover;
    2. Replace the used batteries with new batteries of the same type;
    3. Place the battery cover back and fasten the screw.
(6) Replace fuses as above steps. Use only fuses of the same type as the original ones.

Warning:

1. **Do NOT exceed the “maximum value” indicated in the Specification;**
2. **Do NOT input voltage at the Current Mode, the Resistance Mode, the Diode Mode, the Continuity Mode, or the Temperature Mode;**
3. **Do NOT use the product when the batteries or the battery cover is not placed properly;**
4. **Turn off the product and remove the test leads from the test points before changing batteries or fuses.**

F. Troubleshooting

If your product do not function as normal, the following steps may help you. If the problem still cannot be solved, please contact your dealer.

Problem	Possible Reason
Display Malfunction	Low battery; replace batteries
Symbol	Replace batteries
No current input	Replace fuse

LIMITED WARRANTY
AND LIMITATION OF LIABILITY

Customers enjoy one-year warranty from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alternation, contamination, or abnormal conditions of operation or handling.